

## Preface

This document is summing up the results of the Norwegian-Bulgarian cooperation project, aiming to reduce greenhouse gas emissions and energy use in public sector. The strategic objective has been to build local capacity along several axes, from overall energy and climate planning to practical implementation of energy efficiency measures in municipal buildings. The potential for emission reductions in regional and local sector is large, and this project is an excellent example of the joint efforts needed to reach the planned emission cuts by 2020. The document presents briefly the processes, methods and experiences from the project, with the aim to provide guidance and inspiration to other local and regional authorities entering into similar activities.



The project team would like to express our gratitude to the Mayors of Dobrich, Burgas and Varna for their willingness to contribute actively throughout the process. Without their sincere interest it would not have been possible to realize the project. We also thank the Norwegian municipalities of Arendal and from Sør-Østerdal for their valuable contributions.

### Municipality of Dobrich

Dobrich Municipality has participated in this project in order to continue and improve our efforts to promote good practices for energy efficiency and renewable energy sources. Specifically we have focused on our strategies for sustainable energy development, information campaigns, exchange of good practices and implementation of activities, aiming to encourage collaboration with the private sector to implement energy efficiency measures.



*Detelina Nikolova, Mayor of Dobrich*

### Municipality of Burgas

The global climate changes and the dynamic development of cities impose serious challenges to the local authorities in order to cope with the important problem of the environment pollution. The ambitions of Municipality of Burgas are to develop and to approve efficient mechanisms for reduction of carbon dioxide emissions through implementation of measures for energy efficiency and by stimulating the utilization of renewable energy sources. With the participation in the project, Municipality of Burgas implemented in practice the experience of the Norwegian municipalities in this field which is a serious challenge for the Bulgarian municipalities namely - development and implementation of policies for sustainable energy utilization through the realization of specific investment intentions.



*Dimitar Nikolov, Mayor of Burgas*

### Municipality of Varna

The cultural traditions in Varna are highly valued, and we are eager to combine our efforts on preserving the cultural heritage with the future energy and climate challenges. This project has given us the opportunity to demonstrate that municipal buildings of cultural and historic importance also can be adapted to the stricter energy performance standards we will face in the years to come. Therefore we are very proud of our pilot building, and we will work hard to implement projects of this kind also in other municipal buildings.



*Kiril Yordanov, Mayor of Varna*

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# 1 Executive summary

## 1.1 The partnership and Norway Grants

The project is a collaborative initiative between the Norwegian Association of Local and Regional Authorities (KS) and the Union of Bulgarian Black Sea Local Authorities (UBBSLA). The Bulgarian municipalities of Burgas, Varna and Dobrich as well as the Norwegian municipalities in Sør-Østerdal and Arendal have also taken part in the project. The Bulgarian and the Norwegian municipalities from Sør Østerdal have all signed the EU “Covenant of Mayors” initiative. By signing it, the municipalities have agreed to implement certain measures. The project aims to support the municipalities in their efforts to improve energy performance and reduce greenhouse gas emissions, and therefore it fits well into other ongoing activities such as the Covenant of Mayors initiative.

KS is collaborating with the Norwegian company New Energy Performance AS (NEPAS), on the implementation of the project, which receives EUR 900,000 in financial support from the Norway Grants 2004-2009 promoting Economic Growth and Sustainable Development in Bulgaria

The EEA and Norway Grants aim to reduce economic and social disparities within the European Economic Area (EEA) and to strengthen bilateral relations between the donor and beneficiary states. The EEA and Norway Grants are linked to the Agreement on the European Economic Area, which makes Iceland, Liechtenstein and Norway part of the EU’s Internal Market. Funds are made available to the 12 newest EU member states, and to Greece, Portugal and Spain.

In the period 2004-09, €1.3 billion in support was made available to projects run by the private and public sector, NGOs, research and academic institutions in Central and Southern Europe. Norway provides around 97 percent of the funding. The support includes environmental protection and research, support of children and youth with special needs, conservation and revitalization of cultural heritage, strengthening of civil society and the fight against organized crime. The EEA and Norway Grants also aim to strengthen bilateral relations between the donor states and the 15 beneficiary states. In addition to nearly 320 large-scale partnership projects, hundreds of smaller-scale partnership projects are supported under the many funds and programmes managed at national level.

Iceland, Liechtenstein and Norway and the European Union have agreed that almost €1.79 billion in new financial contributions will be made available to the beneficiary states in the period 2009-14, including areas such as environmental protection, climate change and renewable energy.

## 1.2 Purpose and strategic objective

The purpose of the project is to assist Bulgarian municipalities on the Black Sea coast in their efforts to reduce greenhouse gas emissions from stationary energy consumption. This is a long term and demanding process, thus the strategic objective of the project has been to build local capacity along several axes, from overall energy and climate planning to practical implementation of energy efficiency measures in municipal buildings.

## 1.3 Operational targets

In order to reach the strategic objective, the project identified 6 operational targets to be met through a variety of activities and tasks:

- **Enable** the municipalities to develop local energy and climate plans as a basis for further action in the municipal buildings
- **Provide** practical assistance in establishing an energy inventory of relevant municipal buildings
- **Assess** the status of energy performance and identify energy efficiency measures in a group of municipal buildings
- **Demonstrate** how modern Energy Monitoring Systems can optimize the energy performance of municipal buildings
- **Implement** energy efficiency measures in 3 pilot buildings to demonstrate the feasibility and impact
- **Involve** all relevant stakeholders at political, administrative and technical levels of the municipalities in all the above mentioned activities to prepare all stakeholders for larger scale replication in all municipal buildings

## 1.4 Achievements and results

All the operational targets have been met through the following achievements:

Dobrich, Varna and Burgas municipalities have developed and adopted their local energy and climate plans. These have also been prepared to be reported as SEAPs to the Covenant of Mayors

As coordinated activity with the EU-EIE project SEC-BENCH, a total number of 85 municipal buildings from the 3 municipalities have been mapped in terms of technical attributes and annual energy consumption and registered in the SEC-BENCH Benchmark database.

A number of buildings were selected for more detailed energy audits, and at present 3 buildings have been audited in Varna, 6 in Burgas and 3 in Dobrich.

The municipalities selected one building each for practical implementation of measures. This required both human and financial resources for their involvement in the entire process of design, tendering, procurement, on-site progress monitoring as well as financial control and reporting.

The project has also focused on capacity building through 4 workshops, 2 study trips and a wide variety of practical project tasks within energy planning, energy auditing, energy monitoring as well as the practical processes related to organizing and managing refurbishment activities.

All municipalities are different in terms of the availability and competence of their staff. Although the overall engagement and dedication the municipalities have mobilized during this project have been absolutely fantastic, there are still gaps to be filled, experience to be built and improvements to be identified. Hence, the capacity building should remain a key-activity also for the years to come.

## 1.5 Reshaping the future

On 10 November 2010, the European Commission adopted the Communication "Energy 2020 - A strategy for competitive, sustainable and secure energy"

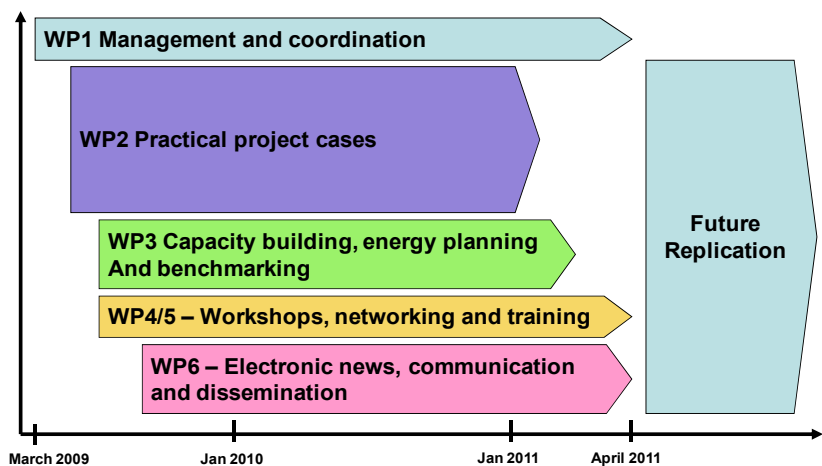
The Communication defines the energy priorities for the next ten years and sets the actions to be taken in order to tackle the challenges of saving energy, achieving a market with competitive prizes and secure supplies and boosting technological leadership. The Communication explicitly points to the important role of public authorities;

*The public sector needs to lead by example. Ambitious objectives ought to be set for public-sector consumption. Public procurement should support energy-efficient outcomes. Innovative integrated energy solutions at local level contributing towards transition to so-called 'smart cities' should be supported. Municipalities represent a major actor in the required change, thus their initiatives like the Covenant of Mayors should be further strengthened. Cities and urban areas, which consume up to 80% of energy, are at the same time part of the problem and part of the solution to greater energy efficiency.*

This project is one small, but still very important step for the participating municipalities in their achievements of fulfilling this strategic objective. Their new experiences in energy planning, energy auditing as well as procurement and tendering processes for energy efficient refurbishment of municipal buildings are critical success factors in this respect. The municipalities of Dobrich, Burgas and Varna have made a head start – together in a regional effort, and should continue to develop their common knowledge-base for the benefit of all. However, it requires firm dedication and leadership at all levels within the municipal organization. Most of the lessons learned during this and other relevant projects are now embedded in the 3 pilot buildings, and these lessons should be exploited fully and developed further.

## 2 The project implementation

The project implementation has been oriented around the practical project cases; the 3 pilot buildings. However, there are several key elements that also need to be in place in order to achieve the desired multiplier effects from such pilot initiatives. Thus, the project has also focused on capacity building within these key areas, notably; energy planning, energy auditing, energy monitoring, as well as the practical processes related to organizing and managing refurbishment activities.



These capacity building activities have partly been implemented by way of seminars, workshops and study trips, dissemination of best practice examples etc. However, the most important playing field for capacity building is that of practical field-work. The successful implementation of energy efficiency refurbishing of the 3 pilot buildings has drastically increased the attention of the politicians and it has developed the administrative and technical know-how of the municipal staff. And finally, but not least, it has clearly demonstrated the benefits of collaboration across municipal, and even national borders.

In order to achieve the strategic objectives, the big efforts remains, namely that of future replication. This is where the real success of the project will be revealed, and where the municipalities need to take the lead.

### 2.1 Sustainable Energy Action Plans

Municipalities across Europe currently experience a significant push to engage more actively to reduce emissions of greenhouse gases. The Commission's initiative "The Covenant of Mayors" has already attracted more than 2000 interested cities and municipalities. The local governments signing up to the Covenant of Mayors commit to submit their Sustainable Energy Action Plans (SEAPs) within the year following adhesion. The Sustainable Energy Action Plan is a key document that shows how the local government will reach its CO<sub>2</sub> reduction target by 2020. Since the Covenant's commitments concern the whole geographical area of the city/town, the SEAP should include actions concerning both the public and private sectors.

In principle, it is anticipated that most SEAPs will include actions in the following sectors:

- Built environment, including new buildings and major refurbishment;
- Municipal infrastructure (district heating, public lighting, smart grids, etc);
- Land use and urban planning;
- Decentralised renewable energy sources;
- Public and private transport policies and urban mobility;
- Citizen and, in general, civil society participation;
- Intelligent energy behavior by citizens, consumers and businesses.

### 2.2 Inventory of municipal buildings

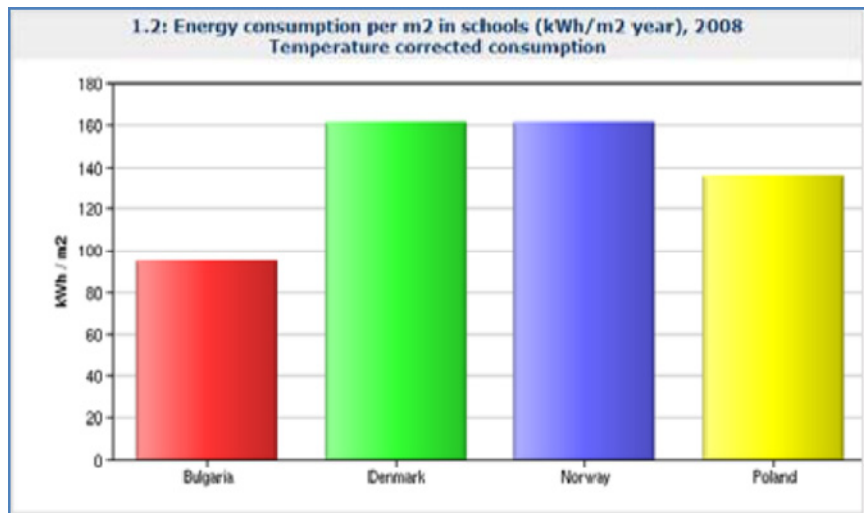
Since most municipalities need to prioritize strictly between all good causes, the first challenge to act on will often be energy efficiency in municipal buildings and technical installations as this will also generate economic savings. The obvious first step for our 3 Bulgarian municipalities has therefore been to map their municipal buildings in terms of location, size, building type and usage, and to the extent possible make registrations of energy consumption for at least one complete year. This mapping has been done on the basis of the data-format from the EU-project SEC-BENCH, and the data sets for the buildings with the most complete energy data have been introduced into the SEC-BENCH database:

- Burgas: 20 buildings
- Dobrich: 15 buildings
- Varna: 50 buildings

The mapping of energy data from all municipal buildings is a continuous process, and the gradual introduction of Energy Monitoring Systems (as described in chapter 2.5) will facilitate this process enormously.

### 2.3 Benchmarking and best practices

Regular collection, analyses and benchmarking of bottom-up energy data from municipal buildings is probably the most Critical Success Factor (CSF) for a continuous realization of the energy efficiency potential in municipal buildings, and thereby saving costs for the municipality. However, benchmarking of municipal buildings can also be useful in several other contexts, e.g. in the approach to the building energy labeling scheme, development of SEAPs, establishment of internal energy management systems etc.



During the EU-project "SEC-BENCH", such data collection routines have been tested in 23 pilot communities from 8 countries across Europe, and Dobrich, Burgas and Varna did the same activity in parallel under this Norway Grants project. The figure above indicates that the registered school buildings in the 3 Bulgarian municipalities consume only 55% of the similar building types in Norway and Denmark.

### 2.4 Energy audits of specific buildings

An Energy Audit is in fact the first concrete step towards practical implementation of energy efficiency measures in a specific building. The Energy Audit makes a detailed analysis of the present energy performance of the building, identifies areas of improvement and recommends a series of practical measures in terms of technology choice, costs, profitability, financing and responsibilities during implementation. All the 3 municipalities have prepared a total of 12 Energy Audits for selected buildings, and these buildings should be expected to appear on the municipal investment plans for the coming years.

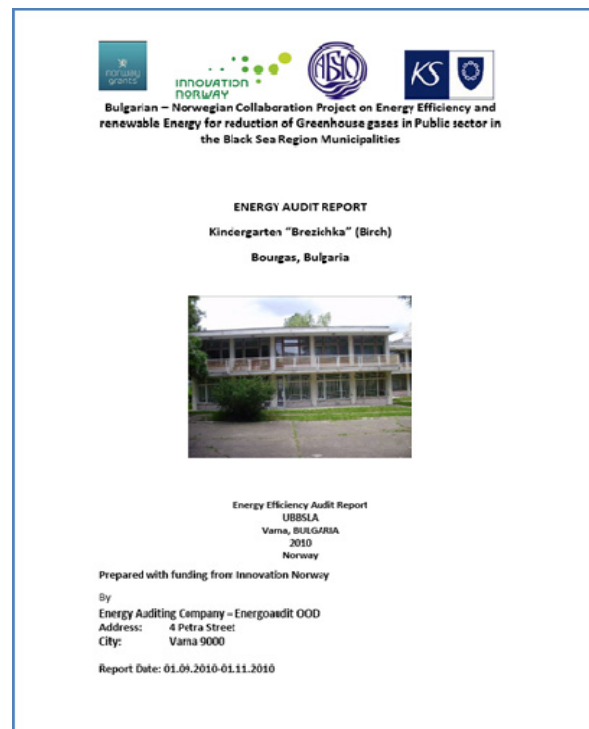
### 2.5 Energy Monitoring systems

"Energy monitoring" is the process of collecting and analyzing energy-consumption data to detect malfunctions and to track changes in energy consumption as time goes on and as energy-saving measures are implemented. Energy monitoring goes hand in hand with energy management for organisations that want to cut their costs and environmental impact by saving energy.

Furthermore energy monitoring is important to take control, detect malfunctions and identify improvements.

Presently available systems are often wireless internet based systems that can collect and transmit gas/el/heat/oil metering values to a central server. Such Energy Monitoring Systems will enable the municipalities to monitor the impact and cost effectiveness of all energy efficiency measures that will be implemented in the future.

The pilot buildings in Varna and Burgas are executed with quite similar Energy Monitoring equipment. In both cases the energy consumption of the main electricity users, like the cooling/heating and the lighting system, will be



metered. The measuring data will be collected by a data logger and transmitted to a computer at the UBLSA office in Varna, where the data will be processed and compared with the base line energy consumption.

- For the Varna building the specific energy consumption is expected to be around 50 kWh/m<sup>2</sup> year.
- For the Burgas Pilot Building a calculation has been made on the energy consumption of the building in its refurbished condition. This will be about 75 kWh/m<sup>2</sup> year and the energy consumption of the Burgas Pilot Building will be compared with this figure.

## 2.6 The Pilot buildings

The recommended procedure of selecting the pilot buildings was initially to identify the most promising cases in terms of suitable complexity with regard to future replication potential, and then make a selection. During this process, the municipal procedures turned out to be more complex than foreseen, and the final selection of the 3 pilot buildings had to be based on rather complex set of criteria of political, technical as well as financial nature. The outcome turned out to be 3 rather different buildings of variable technical standard, a wide variety of energy efficiency measures to be implemented as well as large differences in investment requirements.

Consequently, the 3 buildings represent a wider coverage of formal procedures, applied technologies and management requirements to be tested and demonstrated than foreseen, and the learning effects have therefore been far higher than initially anticipated.

The table below illustrates this:

Pilot building	Dobrich	Burgas	Varna
Technical standard	Medium	Low	Low
Formal procedures	Low complexity	Medium complexity	High complexity
Investment needs	Low	Medium	High
Replication potential	High	High	High (for cultural buildings)

### 2.6.1 The pilot building in Dobrich

#### General information about the building

The pilot building in Dobrich is Kindergarten No 2 “Radost”, which is built in 1963. It is a concrete building with two floors and a flat roof.

The building is partly refurbished in 2005 when 60 % of the existing wooden windows have been changed into energy efficient windows.

This renovation of the windows was financially supported by the Japanese Embassy in Bulgaria as part of a project called ‘Investing in the Future’.

#### The Building envelope

The building envelope consists of 30 cm concrete walls and most floors in the building are wooden floors. Most wet rooms and some bedrooms have terracotta floors. The original building envelope had no wall insulation and neither roof nor floors were insulated. Part of the windows is energy efficient windows. The building is heated by a natural gas fired central heating boiler.



## Energy consumption

- Energy savings 120. 500 kWh/ year or 53 %
- Specific energy consumption 99,5 kWh/m<sup>2</sup> year
- CO<sub>2</sub> emission reduction 40,64 Ton/year

## Energy Saving Measures

Based on the measures proposed in the report of the energy audit that was made, the following measures have been taken:

- Energy efficient windows and entrance doors
- Rehabilitation and waterproofing of the roof
- Solar heating system on the roof of the building for hot water production
- Gasification of the kitchen and refurbishment of the kitchen
- Energy-saving lighting system and exterior facade lighting
- Reconstruction of the existing wiring in the building
- Improved interior.
- Reached energy class “B” after renovation (this was energy class “E” before refurbishment).



## Key figures

<b>Total investment costs</b>	<b>69 500 BGN leva</b>
<b>Annual net cash savings</b>	9 652 BGN leva/year
<b>Pay back period</b>	7,2 years
<b>Expected energy consumption</b>	99,5 kWh/m <sup>2</sup> , year
<b>Architect</b>	
<b>Construction company</b>	„Dobrudja building”Ltd
<b>Kitchen equipment</b>	Coocing range ZANUSSI ZCV 560 MX, Combined gas cooker with el.oven BOMPAMI BO 683 AB/N
<b>Solar heating system</b>	6 panels EcoSol 8200, 2 hot water tanks and 2 circulating pump Grundfoss.
<b>Energy Monitoring System</b>	Danfoss Sonometer™ 1000
<b>Energy efficient lighting system</b>	low consumption lamps

### 2.6.2 The pilot building in Burgas

#### General information about the building

The selected pilot building in Burgas is a former bank building that was built in 1960. The bank part of the building has not been in use for more than one year. The building consists of two floors and a basement. Part of the ground floor of the building is still in use as a shop.

The refurbished building will be used as office of EU Integration Department of Burgas Municipality, and as information and demonstration centre on energy efficiency measures and renewable energy sources.



## The building envelope

The original building envelope consists of 50 cm thick brick walls and has a sloped roof. The concrete slabs are supported by girders. The building envelope has no wall-, roof- or floor insulation. The windows were clear wooden double glass windows. Most windows had metal gratings on the outside of the window.

In the refurbished building the walls and ceiling are insulated and the old window have been replaced by energy efficient ones. The insulation level of the building meets the demands written in the National Energy Efficiency law in Bulgaria.

## Energy consumption

Due to the fact that the building has not been used for several years, there are no recent energy data available. The expected annual specific energy consumption for the refurbished building is 75 kWh/m<sup>2</sup>, year.

## Energy Savings Measures

The building has been refurbished in an energy efficient way with a renewable energy system as heating and /or cooling source. The following energy savings measures have been implemented:

- Insulation measures concerning facades and roof
- Internal reconstruction of the second floor of the building
- New electrical, water and sewage system
- Replacement of the old windows by energy efficient windows, type REHAU
- Renewable energy systems for heating and cooling of the building (heat pump)
- Heat recovery system in the ventilation system
- Energy monitoring system (EMS) for detailed monitoring of the energy consumption

## Key figures

<b>Total investment costs</b>	155.982 BGN leva
<b>Expected energy consumption</b>	75 kWh/m <sup>2</sup> , year
<b>Architect</b>	Stanislav Nikolov
<b>Construction company</b>	“Doroslava”Ltd
<b>HVAC company</b>	GEOTOK
<b>Heating-/Cooling system</b>	Heat pump air to water, Q cool =19, 0 kW, Q heat = 12,9 kW
<b>Energy Monitoring System</b>	Carlo Gavazzi Energy Monitoring
<b>Energy efficient lighting system</b>	compact luminescent lamps

### 2.6.3 The pilot building in Varna

#### General information about the building

The selected pilot building in Varna is a former office building that was built in 1960. The building has not been in use the last year. The building was in a very bad shape, especially the first floor.

After the refurbishment, the building will be used as office building for the municipality of Varna, the Energy Agency and also the local Lions Club will be user of the building. There was an ambition to refurbish this building into one of the first buildings in Bulgaria that has been refurbished according to the Passive House present standard, but this ambition proved to be over-ambitious in view of the budget availability



## The Building envelope

The building envelope consists of 30 cm thick brick walls. The floors in the building are wooden floors. The building envelope has no wall, roof and floor insulation. The windows are clear single clear glass windows.

The refurbished building will meet the standards of a Low Energy House (A “Low Energy House” has maximum energy consumption per square meter of 50 kWh/m<sup>2</sup>, year). The building will be equipped with high levels of insulation, energy efficient windows and low levels of air infiltration.

Since the building was in such a bad shape, some structural works needed to be done to improve the quality of the building envelope.

## Energy consumption

The building has not been used for several years, and because of that no recent energy data are available. An energy consumption calculation has been made to make visible the difference between the former situation and installed technical systems and the energy consumption after refurbishment of the building. The specific energy consumption is calculated to be around 50 kWh/m<sup>2</sup>, year.

## Energy savings measures

The following energy efficiency measures have been implemented:

- Very good insulation of walls, floors and roof of the building
- Energy efficient windows
- Energy efficient lighting system, executed with an intelligent control system
- Energy efficient heat source (heat pump)
- Heat recovery system in the ventilation system
- Energy Monitoring System

## Key figures

<b>Total investment costs</b>	258.680 BGN leva
<b>Expected energy consumption</b>	50 kWh/m <sup>2</sup> , year
<b>Architect</b>	Branimir Georgiev
<b>Construction company</b>	“Burov”Ltd
<b>HVAC company</b>	TERMOVENT
<b>Heating-/Cooling system</b>	Heat pump air to water, Q cool =19, 0 kW, Q heat = 12,9 kW
<b>Energy Monitoring System</b>	Carlo Gavazzi Energy Monitoring
<b>Energy efficient lighting system</b>	compact luminescent lamps and LED lighting

## 2.7 Capacity building

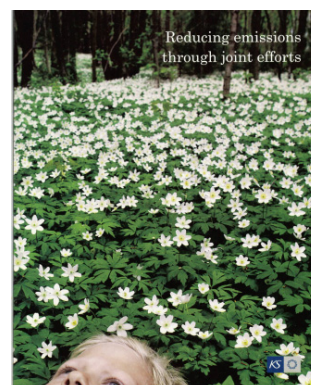
Capacity building through exchange of experiences and best practice examples coupled with practical case work has been the most important element of the project. This approach has indeed been successful, not least thanks to the demanding pilot buildings that were selected as practical cases. Their differences in complexity and technical standard have forced the entire project team to find the best solutions - sometimes quite innovative solutions - together with entrepreneurs, technology providers and the municipal staff.

### 2.7.1 Workshops

Alongside the 3 practical project cases, a total of 4 thematic workshops have been organized in order to support the pilot building processes with practical knowledge related to the different phases of the project. Multiple groups of participants have attended the workshops ; local, regional and national authorities, private industry, universities and NGOs.

#### 1<sup>st</sup> Workshop – General Workshop on Energy Planning, Energy Audits and Energy Monitoring Systems, 22 October 2009, Varna

This workshop aimed to give a general overview of all the different elements to be covered by the project, both in term of planning processes, technologies and capacity building requirements.



## 2nd Workshop - Energy planning at local level, 28-29th January 2010, Varna City Hall

This workshop on local energy and climate planning was co-organized with the SEC-BENCH project of the Intelligent Energy – Europe program, and the aim was to support the ongoing work with Sustainable Energy Action Plans (SEAPs) in Bulgarian municipalities.

## 3rd Workshop – Tendering procedures, 11-12 March 2010 in Burgas/Varna

This workshop was organized twice; on 11th March in Burgas and 12th March in Varna. The workshop topic was on tendering procedures in general and focused specifically on technical considerations for energy refurbishment of municipal buildings.

## 4<sup>th</sup> Workshop - Summing up the results from the project, main lessons learnt, challenges and possibilities, and the next steps forward, 30 March 2011, Varna

This workshop conveys a summary of the project, including development of energy and climate plans and the energy efficiency refurbishment of the 3 pilot buildings in Dobrich, Burgas and Varna. Moreover, the workshop explores the possibilities for replicating these valuable experiences to future work on energy efficiency, renewable energy and reduction of greenhouse gases across the region, and explore financial possibilities.



### 2.7.2 Study tours

#### Study tour to Norway, 31 May – 6 June 2010

A delegation of 22 Bulgarian representatives from the Black Sea Region visited Norway on the first of the project's two study tours. The delegation visited Elverum and Arendal, as well as various technical sites of interest in Oslo. The delegation also met with relevant governmental institutions in Oslo. The study tour provided fruitful input from the experiences the Norwegian municipalities have gained throughout the processes of energy and climate planning, implementation of practical measures as well as the need of governmental support programmes and development of legislative framework conditions was also explored.

#### Study tour to Bulgaria, 26-30 March 2011

A delegation of 9 Norwegian representatives from Sør Østerdal, Arendal and other relevant stakeholders visited Bulgaria on the second of the project's two study tours. The delegation visited Dobrich, Burgas and Varna and took part in the official opening of the pilot buildings. The entire delegation participated actively in the 4th workshop in Varna, summarizing the project and presenting the project achievements.

## 3 What have we learned and how do we proceed

Local authorities need to unite their efforts, to exchange their knowledge and experience and study the European experience in order to improve their energy security and create conditions for their development into energy independent municipalities. This joint Bulgarian-Norwegian project tried to orient the attention of the local authorities towards concrete actions in the field of sustainable energy through well-conceived and properly implemented exchange of information.

### 3.1 Main lessons learned

In brief, the main lessons learned from this project are the following:

**“If we are active, we can have good results. It only depends on us.”**

More specifically, this means that all the efforts needed to achieve concrete results rely on the local stakeholders. Active and genuine involvement cannot be imposed by international policy makers or national regulations. They can only support and stimulate the local actors who make the necessary steps to be taken for successful energy efficiency policy at local level:

- ✓ Political decisions for development of practical and local energy efficiency policy
- ✓ Implementation of energy efficiency information system

- ✓ Building of local capacity
- ✓ Development of Sustainable Energy Action Plans (SEAP)
- ✓ Implementation of SEAPs
- ✓ Willingness and ability to provide appropriate funding

**“We must start with the simple measures first, we must learn to crawl before we can start walking and running”**

Implementation of SEAPs involves a large variety of measures and most municipalities need time to develop the capacity needed. The municipal building stock is under the direct control of the municipality, and represents interesting saving possibilities on the municipalities’ operational budgets if these buildings can improve their energy performance. The municipal building stock is therefore the natural starting point for implementation of the SEAP.

## 4 The way forward

By signing the Covenant of Mayors, more than 2000 European municipalities have demonstrated that they are highly motivated and strive to be sustainable models of evolving the European Community. They have committed themselves to achieve this by reducing energy consumption and CO<sub>2</sub>-emissions and by better protection of the natural environment.

The big question is whether the available means will be sufficient, and whether the speed of implementation is high enough? The answer is probably no! However, it is still important that municipalities press forward and encourage international as well as national policy makers to provide better funding opportunities, more focused framework conditions as well as support mechanisms for building local capacities required for the job.

The standard of living and the financial resources vary a lot between different European countries, and this joint project between Bulgaria and Norway has demonstrated this very well. This is why the EEA and Norway Grants funding opportunities are important tools for leveling out some of these differences.

However, the practical challenges at local level are still more or less the same; shortage of qualified staff with the technical capacity needed, short term policies and not least the difficult task of prioritizing the limited financial allocations between “all the good causes”.

We must therefore take the next step beyond the pilot phases and come to a more large-scale and industrialized approach to realize the huge energy efficiency potential in municipal buildings. The technologies are there, the profitability is quite good but we still have more work to do on the attitudes, willingness and capacity to change.